RELATIONSHIP BETWEEN FARMERS' PARTICIPATION AND EMPOWERMENT IN THE COFFEE IPM-SECP IN EAST JAVA PROVINCE

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ABSTRAK

Proyek Pengendalian Hama Terpadu Perkebunan Rakyat (PHT-PR) diimplementasikan melalui partisipasi para petani dengan tujuan pemberdayaan mereka dalam menerapkan teknis PHT. Tulisan ini ditujukan untuk melihat hubungan antara partisipasi dan pemberdayaan dengan kasus PHT-PR tanaman kopi di kabupaten Malang dan Kediri, Jawa Timur. Kedua kabupaten masing-masing mewakili tingkat partisipasi petani kategori tinggi (Malang) dan rendah (Kediri) yang ditentukan berdasarkan data dan informasi dari institusi PHT-PR kopi Provinsi Jawa Timur. Hasil penelitian menunjukkan bahwa beberapa variabel karakteristik sosial ekonomi petani dan karakteristik proyek memiliki hubungan nyata dengan variabel-variabel pemberdayaan secara sosial (perolehan pengetahuan/keahlian, perubahan teknis usahatani, dan pengambilan keputusan), ekonomi (penurunan biaya produksi, peningkatan produktivitas dan keuntungan), dan kesadaran terhadap lingkungan. Dalam aspek sosial, sebagian besar petani merasakan manfaat pemberdayaan dengan adanya bantuan teknis yang disediakan proyek PHT-PR kopi. Akan tetapi keberadaan peserta perempuan memiliki hubungan yang negatif. Sementara itu, dari segi aspek ekonomi dapat dikemukakan bahwa variabel-variabel yang berhubungan nyata dengan penurunan biaya produksi lebih banyak jumlahnya dibandingkan dengan peningkatan produktivitas dan keuntungan. Dari sisi lingkungan, semakin tinggi persepsi petani terhadap harga kopi maka semakin tinggi pula kesadaran mereka terhadap lingkungan. Akan tetapi, semakin tinggi persepsi petani terhadap biaya partisipasi, maka semakin rendah kepedulian mereka terhadap lingkungan. Berdasarkan hasil penelitian ini disarankan peserta perempuan seyogyanya dipilih secara representatif agar mereka dapat berintegrasi secara efektif dalam kegiatan program PHT-PR. Keberlanjutan program perlu diupayakan setelah kegiatan proyek selesai dilaksanakan, yaitu dalam rangka menjaga dan sekaligus meningkatkan pemberdayaan petani terhadap PHT.

Kata Kunci: Hubungan, Partisipasi, Pemberdayaan, Kopi, Pengelolaan Hama Terpadu

INTRODUCTION

Integrated Pest Management for Smallholder Estate Crops (IPM-SECP) is one of the national IPM programs which aim to develop the implementation of IPM as an approach in managing an economically sound pest management of estates crops. Specifically, the project intends to : (1) improve and protect the environment; (2) improve production quality; and (3) increase productivity and farmers income (*Dirjenbun*, 1998).

Coffee is one of estate crops under the IPM-SECP. This project was primarily implemented in East Java province in 1997. The project intends to : (1) develop the technical capacity of coffee farmers; (2) improve the quantity and quality of coffee

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production; (3) increase farmer's income; and (4) keep, maintain, and raise environmental awareness (*Bagpro* PHT-PR *Jawa Timur*, 2003).

The concept of coffee IPM-SECP is centered on farmer participation and empowerment, which is concerned with improving decision making skills and spurring organized action. Participation enables coffee IPM farmers to be active members of the farm community, while empowerment creates them to become experts in their own field by developing their ability in making critical and informed decisions.

Participation is related to empowerment and can be categorized as one of the key words of development. Participation as empowerment is an approach in which hold complete power over and are fully in control of a program or an institution. Hence, this article attempts to analyze the relationship between farmers' participation and their empowerment in the coffee IPM-SECP.

CONCEPTUAL FRAMEWORK

No pest management program would be successful without full participation by the farmers (Rola and Pingali, 1993). Farmers' indigenous practices as well as institutional and structural arrangements should be considered when planning any pest management program. Therefore, participation is the key word in the implementation of any IPM program.

The IPM does not focus on insect alone, it provides farmers an opportunity to learn and achieve greater control over the conditions that they face at the field level (FAO, 2000). The learning approach in the IPM employs a participatory learning method. The process emphasizes the taking of decision and actions based on an open discussion of ideas, which is free from the domination of any individual. These decisions are the basis for the hypotheses which are tested in the field laboratory. As a result, IPM participants could learn about the cause and effect relationships that exist in the field. In other words, farmers are thus empowered (Dilts and Pointius, 2000).

Participation is like process of adoption. Certain reactions to the participation of people in program development may be a common phenomenon for certain people of certain characteristics (Sumayao, 1983). Hence, some important factors to determine the extent of participation in project implementation can be classified into two categories, namely farmers' socioeconomic characteristics and project characteristics.

Consequently, farmers' empowerment in IPM implementation can be determined through an assessment of the social, economic, and environmental impacts of such practices among IPM farmer-participants. The social impact is reflected in the improvement of knowledge, attitudes, and practices. On the other hand, the assessment of the economic impact is anchored on increasing farm yields and profits. Environmental impact is related to the sustaining the environment (SEAMEO SEARCA, 1999).

METHODOLOGY

The study was conducted in the districts of Malang and Kediri in East Java province from March to April 2003. The districts were selected purposively, Malang representing the high participation group and Kediri as the low participation group. The criteria used in classifying the high and low participation groups were obtained from secondary data and information from the provincial coffee IPM-SECP manager and staff.

The respondents were farmers from 100 households who participated in the coffee IPM-SECP. They were selected using the probability sampling method which drawn from the population at the district level, divided into sub-district level, to farmer's group at village level. Each district represents one sub-district and represented by five villages in Malang and one village in Kediri. Village samples in Malang and Kediri represented by five farmer's groups, respectively. Random samples with proportion 50 percent were selected from each farmer's group. Hence, there were 20 respondents in each farmer's group.

The survey method was employed as the research design for this study which an organized attempt to analyze data and information. The data and information were taken from interviews of farmer participants using structured and unstructured questionnaires, checklist, as well as field notes, and direct observation.

Some substances of socioeconomic characteristics of respondents, project characteristics, and the extent of participation were measured using a point-scale. Responses were scored from low point-scale to high point-score for the positive statements, and from high point-scale to low point-scale for negative statements. The sum of the mean scale for all statements divided by the number of statements/items represents the weighted mean ($\overline{X}$) of the respondents' scores (Appendix Table 1).

The relationship between the socioeconomic characteristics of the respondents, project characteristics, and empowerment in terms of social, economic, and environment

was determined using Spearman's rank-order correlation (Mason and Lind, 1993). The equation for correlation can be written as fallows :

$$\rho_{x,y} = \frac{\operatorname{cov}(x,y)}{\sigma_x . \sigma_y} \quad \ldots\ldots (1)$$

$$\operatorname{cov}(x,y) = \frac{1}{n} \sum_{i=1}^{n} (x_i - \mu_x)(y_i - \mu_y) \quad \ldots\ldots (2)$$

Where : $-1 \leq \rho_{xy} \leq 1$

x = socioeconomic characteristics of the respondents and project characteristics
y = respondents' empowerment
n = number of respondents

RESULTS AND DISSCUSSION

Participation

The summary of socioeconomic characteristics of the respondents and project characteristics is shown in Appendix Table 4. The respondents' socioeconomic characteristics are composed of women participant, household size, labor availability, farm size, land tenure status, gross annual household income, membership in organization, leadership capability, attitude towards and perception about the coffee IPM-SECP, facilities and service availability, market structure (payment system and price determiner), perceived price of coffee, labor use, wage rage, and perceived cost of participation. The project characteristics include institutional support such as training and technical assistance, and cost of participation at the project level. It can be distinguished that the higher is the extent of participation, the higher is the performance in the implementation of the coffee IPM-SECP.

Empowerment

Appendix Table 5 presents the summary of respondents' empowerment as a consequence of their participation in the implementation of the coffee IPM-SECP. The respondents' empowerment covers social empowerment (knowledge/skill gain, change in practices, and decision-making), economic empowerment (reduced production cost, increased productivity and profitability), and environmental empowerment (environmental awareness). Overall, the weighted mean score of respondents in the high participation group was slightly higher as compared to the low participation group ($\overline{X}$ = 3.33 and $\overline{X}$ =

3.21, respectively). In other words, both respondents perceived that the coffee IPM-SECP had empowered them in managing their coffee farms.

Relationship between Participation and Empowerment

Initially, the relationship between socioeconomic characteristics of the respondents, project characteristics, and social empowerment is presented in Table 1. It can be seen that women participation was negatively related to decision-making (r = -0.308) in the high participation group, and knowledge/skills gained (r = -0.272) and change in practices (r = -0.250) in the low participation group. This indicates that an increase in the number of women participants could decrease knowledge/skills gained, change in practice, and decision-making empowerment in the coffee IPM-SECP.

Other variables that were found to be negatively related were labor use and perceived cost of participation to change in practices (r = -0.257 and r = -0.349, respectively), and decision-making (r = -0.248) in the high participation group. This indicates that an increase of the respondents' perceived labor use and cost of participation could decrease change in practices and decision-making in the social empowerment in the coffee IPM-SECP activities.

Variables, which were positively significantly related, was leadership capability to knowledge/skills gained (r = 0.295) in the high participation group, and household size and labor availability to decision-making (r = 0.237 and r = 0.249, respectively) in the low participation group. Land tenure status was found to be significantly related to change in practices in both groups. It means that the bigger the number of owner-operators, the higher social empowerment in terms of change in practices. The owner-operators could be more responsive in relation to change in practice in comparison with lessee, share tenants, and combination of land tenure statuses.

Technical assistance was the only variable of the project characteristics that was found to be significantly related to decision-making in the high participation group (r = 0.264). In conclusion, the respondents in the high participation group were more empowered than those in the low participation group because of the greater technical assistance provided by the coffee IPM-SECP.

Table 1. Relationship between Socioeconomic Characteristics of the Respondents, Project Characteristics, and Social Empowerment According to the Level of Participation

Variable	Social Empowerment					
	High Participation (N=50)			Low Participation (N=50)		
	Knowledge/ Skills Gained	Change in Practice	Decision-Making	Knowledge/ Skills Gained	Change in Practice	Decision-Making
Socioeconomic Characteristics						
Women participant	-0.069	-0.048	-0.308 **	-0.272 *	-0.250 *	-0.112
Household size	0.195	-0.074	-0.014	-0.202	0.211	0.237 *
Labor availability	0.120	0.017	0.007	-0.115	0.080	0.249 *
Farm size	0.024	-0.041	-0.049	-0.134	0.105	-0.064
Land tenure status	-0.163	0.253 *	-0.094	0.078	0.243 *	-0.014
Gross annual household income	-0.003	0.078	0.098	-0.209	-0.142	-0.030
Length of membership in organization	-0.038	-0.170	0.060	-0.271	-0.112	0.124
Leadership capability	0.295 **	0.198	-0.040	-0.060	-0.191	-0.022
Attitude towards coffee IPM-SECP	0.091	0.100	-0.130	-0.090	-0.037	0.133
Perception about coffee IPM-SECP	0.188	-0.031	-0.141	0.028	-0.009	-0.041
Availability of facilities and services	0.116	0.145	-0.160	0.092	-0.230	-0.010
Market structure						
Payment system	0.163	-0.103	-0.040	-0.136	0.155	0.034
Price determiner	0.178	-0.119	-0.074	0.045	-0.037	-0.091
Perceived price of coffee	0.034	0.048	-0.013	-0.125	0.109	-0.213
Labor use	-0.024	-0.257 *	-0.050	0.074	0.071	-0.148
Wage rate	-0.231	-0.035	-0.038	-0.045	-0.066	0.120
Perceived cost of participation	-0.185	-0.349 **	-0.248 *	0.198	0.194	0.143
Project Characteristics (institutional support)						
Training	0.070	-0.050	0.169	-0.135	-0.033	-0.183
Technical assistance	-0.037	-0.062	0.264 *	0.060	-0.064	0.036
Cost of participation at project level	0.116	-0.131	-0.127	-0.109	-0.083	0.047

* significant at 0.10 level
** significant at 0.05 level
*** significant at 0.01 level

Furthermore, Tabel 2 shows the variables under the socioeconomic characteristics of the respondents and the characteristics of project related to economic empowerment. It was noted that the number of variables that were significantly related to reduced

production cost was higher as compared to increased productivity and profitability. Overall, the number of variables that were significantly related to economic empowerment in the low participation group was higher than in the high participation group.

Variables which significantly related to reduced production cost were labor availability, farm size, land tenure status, gross annual household income, length in membership in organizations, perception about the coffee IPM-SECP, price determiner, perceived cost of participation, and training in the low participation group. Meanwhile, in the high participation group, the variables were land tenure status, perceived price of coffee, wage rate, perceived cost of participation, and training.

Variables such as cost of participation ($r = -0.243$) in the high participation group and wage rate ($r = 0.297$) in the low participation group were significantly related to increased productivity. The higher is the perceived cost of participation, the greater is the chance it will enhance increased productivity. Respondents in the low participation group reasoned out that a higher wage rate would encourage increased productivity since it would motivate farmers to be more active in managing their coffee farms, thereby contributing to increase in productivity.

In the high participation group, variables such as length of membership in organization ($r = 0.282$) and cost of participation at the project level ($r = 0.306$) were found to be significantly related to increased profitability. On the other hand, variables which were very highly significant related to increased profitability were farms size, annual household income, and technical assistance in the low participation group. This means that the larger farm size, the higher gross annual household income, and the more satisfactory is the technical assistance, the greater is the probability that profitability would be increased.

Likewise, labor use ($r = -0.307$) and perception about the coffee IPM-SECP ($r = 0.331$) were highly significantly related to increased profitability. Hence, the more amount of labor used by the respondents, the lower would be profitability. The more positive is the perception of the respondents about coffee IPM-SECP, the greater is also the expected increase in profitability. In contrast, perceived cost of participation was negative ($r = -0.500$) which indicates that the higher the respondents' perceived cost of participation, the lower would be profitability.

Table 2. Relationship between Socioeconomic Characteristics of the Respondents, Project Characteristics, and Economic Empowerment According to the Level of Participation

Variable	Economic Empowerment					
	High Participation (N=50)			Low Participation (N=50)		
	Reduced Production Cost	Increased Productivity	Increased Profitability	Reduced Production Cost	Increased Productivity	Increased Profitability
Socioeconomic Characteristics						
Women participant	0.003	-0.224	-0.218	-0.013	0.122	-0.170
Household size	-0.031	0.064	-0.101	0.212	-0.074	0.102
Labor availability	-0.041	0.021	-0.083	0.297 **	-0.233	0.081
Farm size	-0.072	0.108	-0.178	0.379 ***	-0.073	0.380 ***
Land tenure status	-0.260 *	-0.025	0.036	-0.247 *	0.122	-0.245
Gross annual household income	0.002	0.162	-0.004	0.389 ***	-0.021	0.479 ***
Length of membership in organization	-0.221	-0.078	0.282 **	0.478 ***	-0.053	0.685 ***
Leadership capability	0.116	0.101	-0.121	0.034	-0.134	0.016
Attitude towards coffee IPM-SECP	0.181	-0.207	0.043	0.064	-0.091	0.119
Perception about coffee IPM-SECP	0.180	-0.048	0.051	0.245 *	0.122	0.331 **
Availability of facilities and services	0.158	0.039	0.076	0.127	0.210	0.047
Market structure						
Payment system	0.036	0.025	0.145	0.188	-0.298	-0.019
Price determiner	0.110	-0.041	0.042	0.279 **	-0.194	0.139
Perceived price of coffee	0.247 *	0.007	-0.127	-0.222	-0.081	-0.167
Labor use	-0.128	0.066	0.092	-0.199	0.080	-0.307 **
Wage rate	-0.423 ***	0.088	0.078	-0.057	0.297 **	0.133
Perceived cost of participation	-0.309 **	-0.243 *	0.015	-0.408 ***	0.185	-0.500 ***
Project Characteristics (institutional support)						
Training	0.455 ***	0.204	-0.277	0.297 **	-0.070	0.160
Technical assistance	0.013	0.063	-0.194	0.225	0.038	0.474 ***
Cost of participation at project level	-0.074	-0.098	0.306 **	-0.192	0.157	0.192

* significant at 0.10 level
** significant at 0.05 level
*** significant at 0.01 level

Finally, Table 3 shows that gross annual household income and length of membership in organization were very highly significantly related to environmental

empowerment for both groups of participation. Farm size and land tenure status were very highly significantly related to environmental empowerment in the low and high participation groups (r = 0.380 and r = 0.261, respectively). The larger farm size and the bigger are the number of owner-operators, the higher would be the environmental empowerment. This could probably be due to owned farm size and owner-operators being more conscious of environmental awareness because they base their farming operations on risk factor.

Finally, Table 3 shows that land tenure status, gross annual household income, and length of membership in organization were significantly related to environmental empowerment for both groups of participation. Land tenure status was positively related to environmental empowerment which indicates that the bigger is the number of owner-operators; the higher would be the environmental empowerment. This could probably be due to owner-operators being more conscious of environmental awareness because they base their farming operations on risk factor.

In the high participation group, the variables that were very highly and significantly related to environmental empowerment were perceived price of coffee (r = 0.456) and cost of participation at the project level (r = 0.388). This implies that the higher is the perceived price of coffee, the higher is the likelihood that it would encourage environmental empowerment of the respondents. This is also the same with cost of participation at the project level.

In the case of low participation group, farm size (r = 0.380), perceived cost of participation (r = -0.500), technical assistance (r = 0.474) were very highly significantly related to environmental empowerment. The larger is the farm size and the more favorable the technical assistance, the greater is the likelihood that the respondents' environmental empowerment would increase. However, perceived cost of participation was negatively related to environmental empowerment, which indicates that the higher is the respondents' perceived cost of participation; the lower would be the environmental empowerment.

Table 3. Relationship between socioeconomic characteristics of the respondents, project characteristics, and environmental empowerment according to the level of participation

Variable	Environmental Empowerment	
	High Participation (N=50)	Low Participation (N=50)
Socioeconomic Characteristics		
Women participant	-0.133	-0.170
Household size	0.091	0.102
Labor availability	0.080	0.081
Farm size	0.160	0.380***
Land tenure status	0.261***	0.245*
Gross annual household income	0.263***	0.479***
Length of membership in organization	0.400***	0.685***
Leadership capability	-0.083	0.016
Attitude towards coffee IPM-SECP	-0.048	0.119
Perception about coffee IPM-SECP	-0.020	0.331**
Availability of facilities and services	-0.104	0.047
Market structure		
Payment system	0.280	-0.019
Price determiner	0.090	0.139
Perceived price of coffee	0.456***	0.167
Labor use	-0.052	-0.307**
Wage rate	0.028	
Perceived cost of participation	-0.106	-0.500***
Project Characteristics (institutional support)		
Training	-0.136	0.160
Technical assistance	0.051	0.474***
Cost of participation at project level	0.388***	0.200

Note: * Significant at 0.10 level
** Significant at 0.05 level
*** Significant at 0.01 level

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Generally, the extent of farmers' participation related to the performance of the coffee IPM-SECP implementation. On the other hand, farmers' perceived that the coffee IPM-SECP had empowered them in terms of social, economic, and environmental aspects in managing their coffee farms.

In terms of social empowerment, women participation was negatively related to knowledge/skills gained, change in practices, and decision-making. This indicates that an increase in the number of women participants could decrease knowledge/skills gained, change in practice, and decision-making empowerment in the coffee IPM-SECP. Nevertheless, most of respondents were empowered due to the greater technical assistance provided by the coffee IPM-SECP.

In relation to economic empowerment, variables that were significantly related to reduced production cost were higher as compared to increased productivity and profitability. It indicates that farmers' perception about reduced production cost was relatively little bit more essential than increased productivity and profitability. On the other hand, the higher is the perceived cost of participation, the greater is the chance it will enhance increased productivity. Similarly, the higher wage rate would encourage increased productivity since it would motivate farmers to be more active in managing their coffee farms, thereby contributing to increase in productivity. Moreover, the larger farm size, the higher gross annual household income, and the more satisfactory is the technical assistance, the greater is the probability that profitability would be increased.

Concerning the environmental/ecological empowerment, the larger farm size and the bigger are the number of owner-operators, the higher would be the environmental empowerment. This could probably be due to owned farm size and owner-operators being more conscious of environmental awareness because they base their farming operations on risk factor. Furthermore, the higher is the perceived price of coffee, the higher is the likelihood that it would encourage environmental empowerment of the respondents. This is also the same with cost of participation at the project level. However, perceived cost of participation was negatively related to environmental empowerment, which indicates that the higher is the respondents' perceived cost of participation; the lower would be the environmental empowerment.

RECOMMENDATIONS

Based on aforementioned, it can be recommended that women participants should representatively selected so that they would effectively integrated in the activities of the coffee IPM-SECP. On the other hand, the sustainability of the program after the termination of the project should be institutionally maintained so that farmers would be more develop and thus sustainable empowered.

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APPENDICES

Appendix Table 1. Determinants variables of farmer's participation in the implementation of the coffee IPM-SECP

Variable	Determinant
Socioeconomic Characteristics	
Women participant	Percentage of women participants in the IPM-SECP (percent)
Household size	Mean household size (person).
Labor availability	Mean number of persons in the household whose age was within 15 years old and above (person).
Farm size	Mean owned household farm size (hectare).
Land tenure status	Percentage of owner-operators vis-à-vis lessee, share tenant, and combination of tenure statuses (percent).
Gross annual household income	Mean gross annual household income (Rp.)
Length of membership in organizations	Mean respondent's length of membership in established organizations at village level (year)
Leadership capability	The weighted mean scores ($\overline{X}$) of respondents' assessment of the level of leadership level in agricultural development programs and the coffee IPM-SECP which measured using a five-point scale of 1 (very poor), 2 (poor), 3 (moderate), 4 (good), and 5 (very good).
Attitude towards the coffee IPM-SECP	The weighted mean scores ($\overline{X}$) of respondents' opinion or reaction whether favorable or unfavorable towards the coffee IPM-SECP which measured using a five-point scale of 1 (lowly favorable), 2 (unfavorable), 3 (moderate favorable), 4 (favorable), and 5 (highly favorable).
Perception about the coffee IPM-SECP	The weighted mean scores ($\overline{X}$) of respondents' view about the effectiveness of the implementation of the coffee IPM-SECP activities and practices, and the level of awareness of the project provisions given by the coffee IPM-SECP which measured using a five-point scale of 1 (very lowly not effective), 2 (not effective), 3 (fair/moderately effective), 4 (highly effective), and 5 (very highly effective).
Availability of facilities and services	The weighted mean scores ($\overline{X}$) of available facilities and services to the respondents measured in terms of respondents' response which measured using a three-point scale of 1 (inaccessible), 2 (accessible), and 3 (very accessible).

Appendix Table 1. Continued …

Variable	Determinant
Market structure	
Payment system	The weighted mean ($\bar{X}$) of respondents' practices about payment system in the marketing of coffee which measured using two-point scale, namely 1 (cash and carry) and 2 (cash)
Price determiner	The weighted mean ($\bar{X}$) of respondents' experience about price determiner in the marketing of coffee which measured using three point-scale, namely 1 (buyer/trader), 2 (both seller and buyer), and 3 (seller/farmer)
Perceived price of coffee	Mean prevailing actual price of coffee (Rp/kg) at the farm level
Labor use	The weighted mean scores ($\bar{X}$) of respondents' perception about labor requirement in the activities and practices of the coffee IPM-SECP which measured using a five-point scale of 1 (very little), 2 (little), 3 (fair), 4 (much), and 5 (very much).
Wage rate	The weighted mean scores ($\bar{X}$) of respondents' perception on the favorableness of the wage rate on their participation in the coffee IPM-SECP which measured using a five-point scale of 1 (very low), 2 (low), 3 (fair), 4 (high), and 5 (very high).
Perceived cost of participation	The weighted mean scores ($\bar{X}$) of respondents' perception regarding the cost of participation in relation to the opportunity cost in joining the coffee IPM-SECP which measured using a five-point scale of 1 (very low), 2 (low), 3 (fair), 4 (high), and 5 (very high).
Project Characteristics (Institutional support)	
Training	The weighted mean scores ($\bar{X}$) of the usefulness of the training in the coffee IPM-SECP which measured using a four-point scale of 1 (not useful), 2 (fairly useful), 3 (useful), and 4 (very useful).
Technical assistance	The weighted mean scores ($\bar{X}$) of respondents' assessment and their level of satisfaction of performance of technical assistance of the coffee IPM-SECP which measured using a five-point scale of 1 (very unsatisfactory), 2 (unsatisfactory), 3 (fair), 4 (satisfactory), and 5 (very satisfactory).
Cost of participation at the project level	The difference mean cost of coffee farming between respondents' practices and IPM-SECP implementation (Rp/ha).

Appendix Table 2. Determinants variables of farmers' empowerment in the implementation of coffee IPM-SECP

Variable	Determinant
Social Empowerment	
Knowledge/skills gained	The weighted mean scores ($\bar{X}$) of respondents' knowledge/skills gained which measured using a five-point scale of 1 (very little), 2 (little), 3 (moderate), 4 (much), and 5 (very much).
Change in practice	The weighted mean scores ($\bar{X}$) of the change rate of farm practices adopted by respondents from the coffee IPM-SECP which measured using a five-point scale of 1 (very seldom), 2 (seldom), 3 (moderate), 4 (always), and 5 (very often).
Decision-making	The weighted mean scores ($\bar{X}$) of respondents' decision-making towards sound crops management under the coffee IPM-SECP which measured using a five-point scale of 1 (very low), 2 (low), 3 (moderate), 4 (high), and 5 (very high).
Economic empowerment	
Reduced production cost	The weighted mean scores ($\bar{X}$) of respondents' reduced production cost under the coffee IPM-SECP which measured using a five-point scale of 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree).
Increased productivity	The weighted mean scores ($\bar{X}$) of respondents' increased productivity under the coffee IPM-SECP which measured using a five-point scale of 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree).
Increased profitability	The weighted mean scores ($\bar{X}$) of respondents' increased profitability under the coffee IPM-SECP which measured using a five-point scale of 1 (very poor), 2 (poor), 3 (moderate), 4 (good), and 5 (very good).
Environmental/Ecological Empowerment	
Environmental/ecological awareness	The weighted mean scores ($\bar{X}$) of respondents' perception of environmental and ecological awareness in the coffee IPM-SECP which measured by assigning a five-point scale of 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree).

Appendix Table 3. Socioeconomic characteristics of the respondents and project characteristics of the coffee IPM-SECP

Variable	High Participation (N=50)	Low Participation (N=50)
Socioeconomic Characteristics		
Women participants (percent)	0.10	0.02
Household size (person)	3.28	3.66
Labor availability (person)	2.92	3.04
Farm size (hectare)	1.10	0.84
Owned land tenure status	0.90	0.90
Gross annual family income (Rp)	8,574,564	7,031,391
Length of membership in organization (year)	3.10	3.70
Leadership capability ($\bar{X}$)	3.95	3.87
Attitude towards IPM-SECP ($\bar{X}$)	3.49	3.44
Perception about IPM-SECP ($\bar{X}$)	3.68	3.49
Availability of facilities and services ($\bar{X}$)	2.08	2.07
Market structure		
Payment system ($\bar{X}$)	1.10	1.40
Price determiner ($\bar{X}$)	1.32	2.72
Perceived price of coffee (Rp/kg)	11,450	11,390
Labor use ($\bar{X}$)	3.22	3.36
Wage rate ($\bar{X}$)	3.23	3.29
Perceived cost of participation ($\bar{X}$)	3.19	3.35
Project Characteristics (institutional support)		
Training ($\bar{X}$)	3.22	2.85
Technical assistance ($\bar{X}$)	2.86	2.84
Cost of participation at the project level (Rp/ha)	-4,570,548	-5,951,081

Appendix Table 4. The weighted mean score ($\bar{X}$) of respondents' empowerment from their participation in the implementation of the coffee IPM-SECP

Variable	High Participation (N=50)	Low Participation (N=50)
Social Empowerment		
Knowledge/skills gain	3.90	3.74
Change in practices	3.50	3.30
Decision making	3.46	3.38
Economic/Financial Empowerment		
Reduced production cost	1.76	1.70
Increased productivity	4.16	4.04
Increased profitability	2.64	2.58
Environmental/Ecological Empowerment		
Environmental/ecological awareness	3.86	3.73
Overall	3.33	3.21